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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,982	05/25/2006	Shuichi Fujii	81872.0113	6452
73230	7590	08/25/2011	EXAMINER	
DLA PIPER US LLP 1999 AVENUE OF THE STARS SUITE 400 LOS ANGELES, CA 90067-6023			BERDICHEVSKY, MIRIAM	
			ART UNIT	PAPER NUMBER
			1723	
			NOTIFICATION DATE	DELIVERY MODE
			08/25/2011	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/580,982

Applicant(s)

FUJII ET AL.

Examiner

MIRIAM BERDICHEVSKY

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on rice 6/20/2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 27-38 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 27-38 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-943)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Remarks***

Claims 27 and 35 are amended. Claims 36-38 are new. Claims 27-38 are currently pending.

### ***Status of Rejections***

All rejections from the previous office action are withdrawn in view of Applicant's amendments. New ground of rejection is presented as necessitated by amendment.

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/20/2011 has been entered.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 27-30 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama (US 2003/0024733), Komori (US 6265242) and Lindmayer (US 4057439).

As to claim 27, Aoyama teaches a solar cell module comprising: a first solar cell having front and rear surfaces, a first bus bar on the front surface having a longitudinal direction (2), an inner lead for electrically connecting the first bus bar to a second bus bar of a second solar cell, wherein in a plan view the bus bar is wider than the lead such that there exists a first region of the bus bar connected to the lead and a second region including an edge portion parallel to the longitudinal direction that is nearer the edge than the first region (figure 6). Aoyama is silent to the particulars of the rear solar cell surface and therefore specifically a second bus bar on the rear surface, the second solar cell to which the lead is connected and a filler sealing the bus bars and lead.

Komori teaches a first solar cell with a bus bar on the light receiving side connected serially to the bus bar of a second solar cell located on the non-light receiving side (figure 7B and col. 24, lines 1-35). Lindmayer teaches encapsulating serially connected solar cells for their protection from ambient conditions (claim 1 and figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the second bus bar on the rear surface of Komori in Aoyama in order to collect current and output an electromotive force, as taught by Komori (col. 24, lines 1-

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35) wherein coupling solar cells in series increases voltage. One of ordinary skill in the art at the time of the invention would have found it obvious to encapsulate the cells of modified Aoyama with filler in order to protect the cells from ambient conditions as taught by Lindmayer (claim 1 and figure 2). The Examiner notes that modified Aoyama reads on the instant claimed invention because modified Aoyama will have the second region in direct contact with the filler.

Further regarding claim 27, there will inherently be a degree of error in the width alignment of the inner lead and the bus bar electrode during the manufacturing modified Aoyama, thereby reading on the instant claimed invention. Reading the references as a whole, one would appreciate that modified Aoyama does not require exact alignment between the inner lead and the bus bar electrode such that it would have been obvious to one of ordinary skill at the time of the invention to reduce accuracy of alignment to increase speed of manufacturing while still providing an operational solar cell.

Regarding claim 28, modified Aoyama teaches that the inner lead has solder at its center portion in the width (Aoyama: figure 2A).

Regarding claim 29, modified Aoyama teaches a plurality of finger electrodes (205) connected to the bus bar on the light receiving surface (Komori: figures 5A-B).

Regarding claim 30, modified Aoyama teaches that the finger electrodes are in contact with filler over their whole length (Aoyama: figure 2B; solder does not run from lead).

Regarding claim 35, modified Aoyama teaches that the second region is positioned on either side (2 not covered by 3) of the first region such that the first region is in the center from a plan view (2 covered by 3) (Aoyama: figure 6).

Regarding claim 36, there will inherently be a degree of error in the width alignment of the inner lead (first connected area) and the bus bar electrode (second connected area) and therefore the solder thereon during the manufacturing modified Aoyama, thereby reading on the instant claimed invention. Reading the references as a whole, one would appreciate that modified Aoyama does not require exact alignment between the inner lead and the bus bar electrode such that it would have been obvious to one of ordinary skill at the time of the invention to reduce accuracy of alignment (differing first and second connection areas) to increase speed of manufacturing while still providing an operational solar cell.

4. Claims 31-32 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama, Komori and Lindmayer as applied to claim 29 above and further in view of Okada (JP 2000332272).

Regarding claims 31-32, modified Aoyama is silent to the finger electrodes having a coating (claim 31) made of solder resist (claim 32). Okada teaches a method of making a solar cell that uses a solder resist on a portion of the electrode to minimize forming solder bridges (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the solder resist on the finger electrodes at the juncture with the bus bar to further prevent solder bridges between finger electrodes, as taught by Okada ([0005]).

Regarding claim 37, modified Aoyama teaches controlling the amount of solder such that solder does not overflow onto the substrate and off the bus bar to avoid lowered power output efficiency of the solar cell (Aoyama: [0012]). Modified Aoyama is specifically silent to the finger electrode ends being in direct contact with the filler. Okada teaches using a solder resist to prevent solder bridges between the finger electrodes (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to prevent solder from flowing onto the finger electrode ends such that filler comes into direct contact with the finger electrode ends to prevent lowered power output and solder bridges resulting from solder flowing off the bus bar, as taught by Aoyama and Okada ([0012] and abstract, respectively).

Regarding claim 38, there will inherently be a degree of error in the width alignment of the inner lead and the bus bar electrode during the manufacturing modified Aoyama, thereby reading on the instant claimed invention. Reading the references as a whole, one would appreciate that modified Aoyama does not require exact alignment between the inner lead and the bus bar electrode such that it would have been obvious to one of ordinary skill at the time of the invention to reduce accuracy of alignment such that the inner lead overlaps the finger electrode to increase speed of manufacturing while still providing an operational solar cell. Modified Aoyama teaches controlling the amount of solder such that solder does not overflow onto the substrate and off the bus bar to avoid lowered power output efficiency of the solar cell (Aoyama: [0012]). Okada teaches using a solder resist to prevent solder bridges between the finger electrodes (abstract). Although modified Aoyama is specifically silent to a space between the inner

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lead and finger electrodes occupied with filler; it would have been obvious to one of ordinary skill in the art at the time of the invention to prevent solder from flowing onto the finger electrode ends such that filler comes into direct contact with the finger electrode ends to prevent lowered power output and solder bridges resulting from solder flowing off the bus bar, as taught by Aoyama and Okada ([0012] and abstract, respectively). As a result of the resist and the solder between the inner lead and the bus bar (to which the finger electrodes connect) there will inherently be a space between the finger electrode and inner lead and during encapsulation the filler will fill all spaces thereby reading on the instant claimed invention.

5. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama, Komori and Lindmayer as applied to claim 27 above and further in view of Tanaka (US 20020148499).

Regarding claim 33, modified Komori is silent to the solder specifically containing bismuth. Tanaka teaches a solar cell string which uses a lead free bismuth containing solder ([0019]) because lead is harmful ([0013]). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the solder of Tanaka in modified Aoyama because the solder is a known material used for the same intended purpose and solving the same problem, lead free making it safe for the environment, as taught by Tanaka ([0013]) (MPEP 2144).

6. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama, Komori and Lindmayer as applied to claim 27, above and further in view of Lally (US 6198207) and Kujas (US 4685604).



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Regarding claim 34, modified Aoyama teaches using a Sn based solder (table 2) but is silent to the solder having a sum of contraction (shrinkage) coefficients by weight percent less than 2.8%. Lally teaches a solder composition for an electronic device which has Sn and a shrinkage coefficient of 0.3% which reduces the residual stresses after solidification of the solder (col. 5, lines 44-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the low shrink solder of Lally in modified Aoyama because the low shrinkage property reduces residual stresses, as taught by Lally (col. 5, lines 55-60) especially in light of the fact that the solar art has recognized the same problem: severe expansion and contraction of solder joints to promote stress and failure, as taught by Kujas (col. 1, lines 10-20).

### ***Response to Arguments***

14. Applicant's arguments with respect to claim 27 have been considered but are moot in view of the new ground of rejection necessitated by amendment.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MIRIAM BERDICHEVSKY** whose telephone number is (571)270-5256. The examiner can normally be reached on M-Th, 10am-8pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MIRIAM BERDICHEVSKY/  
Examiner, Art Unit 1723